

VIDYA PRATISHTHAN'S KAMALNAYAN  
BAJAJ INSTITUTE OF ENGINEERING  
AND TECHNOLOGY, BARAMATI



ELECTRONICA  
October 2022



## About Department:

Electronics And Telecommunication Department was established in the year 2000. The intake for under graduate course is 60. Electronics And Telecommunication Department is committed to provide quality education in the field of Telecommunication. The strength of the Department is qualified and devoted faculty, motivated students and well equipped labs. Our faculty and students work together to study, experiment and to solve problems in the various fields such as Networking, Security, Information Retrieval, Image Processing and Pattern Analysis.

## Mission:

To develop professionals in Electronics and Telecommunication Engineering to contribute in solving technological problems faced by society.

## Program Educational Outcomes:

- To apply the knowledge of Electronics and Telecommunication Engineering to build career in core and allied industries
- To prepare students for higher studies, competitive exams and multidisciplinary work
- To follow professional ethics and address social concerns
- To be lifelong learner to engross newer technologies



## Program Specific Outcomes:

**PSO1:** To develop competencies to solve real-life problems in the Electronics and Telecommunication Engineering domain at the same time inculcate professional behavior imbibe with human values and ethics .

**PSO2:** To acquire the knowledge of embedded systems, communication, signal processing for hardware/software design and development.

**PSO3:** To demonstrate the competencies to use modern tools and techniques to design electronic systems in diverse fields as per societal needs.



# Principal's Desk



Dr. R. S. Bichkar  
Principal,  
Dept of E & TC  
Engineering  
VPKBIET, Baramati.

I feel very elated and at the same time privileged to share a few words as you go through the pages of the magazine “Electronica”. Electronics and Telecommunication department endeavors to help students to seek the best from the surroundings. The knowledge thus gained becomes a ladder for them to soar into greater heights. It's often the collective effort that leads to the discovery and fulfillment of aspirations.

I am sure, the task force of Electronics and Telecommunication engineering department has taken lead, to one of the best examples of not only the land of ideas but also the forest of excellent products.



# Vice-Principal's Desk



Dr. S. B. Lande  
Vice-Principal,  
Dept of E & TC Engineering  
VPKBIET, Baramati.

I am delighted to hear that the Department of Electronics and Telecommunication Engineering is bringing their Technical Magazine 'Electronica' Issue-July 2022. It is a tool for faculty and students to develop productive technical materials and support skills. The most important thing you can get out of this fantastic effort is that it brings out the various technical and analytical skills of novice engineers. I am happy to welcome all the teachers and students who are more interested in bringing articles with more bright concepts and innovative ideas in the coming issues.

I wish the "Department of Electronics and Telecommunication Engineering" of this organization great success in all their endeavors. I congratulate the Head of the Department of Electronics and Telecommunication Engineering, the Editor and his dedicated committee for their invaluable efforts in bringing this issue to the fore. I wish them all success.



# HOD's Desk



Dr. B. H. Patil  
HOD,  
Dept of E & TC Engineering  
VPKBIET, Baramati.

Ever since the department of Electronics and Communication Engineering started its journey over two decades back, the department has been simultaneously and successfully performing the multiple roles of creating new knowledge, acquiring new capabilities and producing an intelligent human resource pool contributing in various domains of the society. The Department has always been on a high growth path and has experienced and dedicated faculty with strong commitment to engineering education who work with zeal and enthusiasm to provide a vibrant and optimum learning environment.

The growth of expertise in the department is commendable. In keeping with the department's vision, the holistic development of the students is focused upon that instills a habit of continued learning and a sense of responsibility in them to contribute towards the betterment of the society.

The periodically updated curriculum imparts technical knowledge to the students and the application based environment in the state of the art laboratories complements the same. The students are motivated to participate in paper presentation, workshops and seminars that are essential to maintaining proficiency. Cultural activities are also promoted through various clubs at the Departmental and University level.

# Placements

Vidya Pratishthan's  
Kamalnayan Bajaj Institute of Engineering and Technology,  
Baramati

## Electronics and Telecommunication Engineering

### Recent Placements Update

**Hearty Congratulations!!!**  
to all the selected students

**Sameer Hake**  
(Cognizant)

**Priyanka Arade**  
(Schaeffler)

**Yuvraj More**  
(Hexaware)

**Snehal Bairagi**  
(Cognizant)

**Shweta Suryavanshi**  
(Cognizant)

**Karan Yedale**  
(Cognizant)

**Aparna Nanaware**  
(Cognizant and  
Schaeffler)

**Manasi Chavan**  
(Cognizant)

**Vidya Ghogare**  
(Cognizant)

**Divya Parvekar**  
(Cognizant)

**Chaitrali Bhise**  
(Cognizant)

**Siddhi Shaha**  
(Cognizant)

**Komal More**  
(Schaeffler)

**Misba Attar**  
(Cognizant)

**Shubham Godse**  
(Schaeffler)

**11 Students Placed in Cognizant**

# 5 G Technology

## What is 5G?

5G wireless technology is meant to deliver higher multi-Gbps peak data speeds, ultra low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. Higher performance and improved efficiency empower new user experiences and connects new industries.

## History

**First generation - 1G:** 1980s: 1G delivered analog voice.

**Second generation - 2G:** Early 1990s: 2G introduced digital voice (e.g. [CDMA](#)- Code Division Multiple Access).

**Third generation - 3G:** Early 2000s: 3G brought mobile data (e.g. CDMA2000).

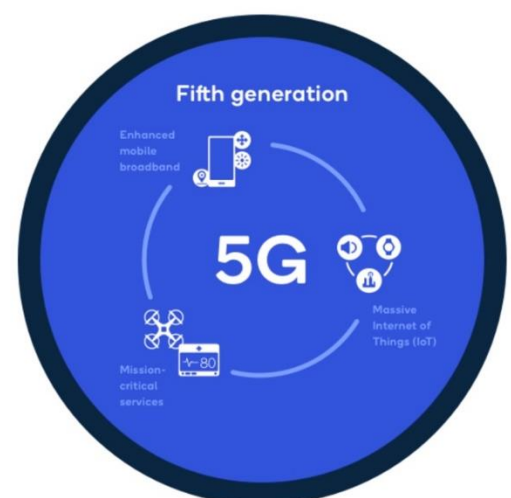
**Fourth generation - 4G LTE:** 2010s: 4G LTE ushered in the era of mobile broadband.

1G, 2G, 3G, and 4G all led to 5G, which is designed to provide more connectivity than was ever available before.

5G is a unified, more capable air interface. It has extended capacity to enable next-generation use cases, new deployment models and deliver new services.

## 5G Implementation Types:

1. 5G non standalone (NSA)
2. 5G standalone (SA)





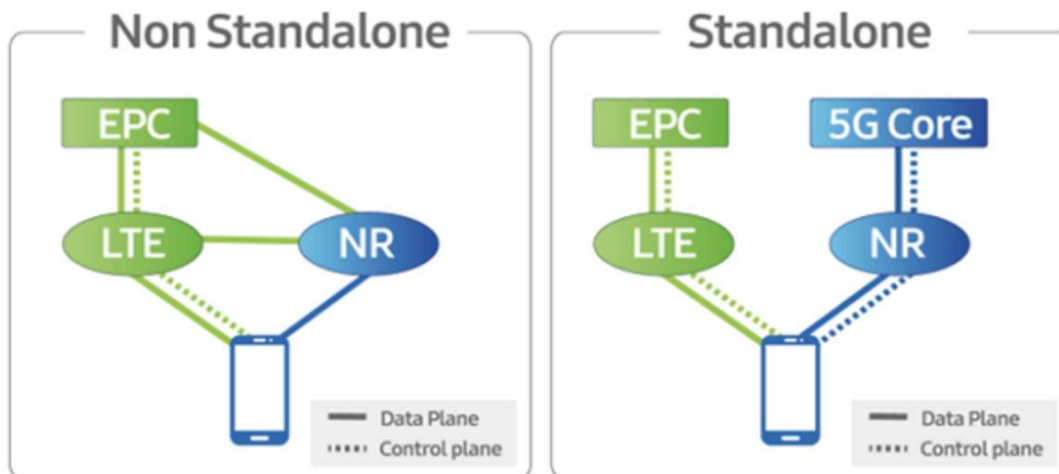
## Stand Alone (SA) Vs non standalalone (NSA) 5G:

Lets try to understand 5G SA vs 5G NSA with simple/crude example how the two are different.

Suppose you are living in a 2 bedroom house and now want to live in a 3 bedroom house. You are evaluating two options to do that 1) construct additional room in your backyard adjoining current house 2) construct a 3 bedroom house on a new plot from scratch. Now option 1 of will be cheaper, faster but will only be an improvement on your existing house design and house condition with no/limited impact on age of the house. Option 2 will be costly, slower but will give you a brand new house and set you free from limitation of the old house.

Option 1 is Non Stand alone (NSA) 5G where one is upgrading your existing telecom infra to 5G while Option 2 is Stand Alone (SA) 5G where one is getting totally new 5G compliant telecom infra.

Airtel is mostly going for NSA 5G and Jio is going for SA 5G.



## Any possible benefits to India in near future?

Clean and fast data access will make cloud computing and platform/software/application-as-a-service a reality, at an affordable price. Companies can vastly benefit from this plus big data, analytics, etc., without paying a lot of money.

- Huge opportunities for start-ups readying Apps and Services for 5G for India and the world.
- 100% rural broadband coverage possible with a combination of LEOs being launched with 5G.

- End-users will benefit from large applications of AI in their dealings with entities-banks, finance, education etc. Also experience for the first time what people in other countries take for granted- no waiting for download, no buffering, full data security etc. 5G will ensure high reliability connections that are fast and secure.
- As for the big touted benefits that others will enjoy, only time will tell: if, when and whether we will get these services. 5G is only an enabler. Smart cities will need knowledgeable administrators. If they utilise IT and communications, 5G will be there to help. Same for education. VR and AR can take education to a much higher level, making a rural schoolchild the equal of a city schoolchild.

### **Private 5G for Enterprises:**

5G is not only restricted to on prime customers but can be implemented as Private 5G. Here are some key differentiators of Private 5G (P5G) over general on prime 5G:

- **Delivered as-a-Service:** Delivered together with global service providers and system integration partners, the offer reduces technical, financial, and operational risks for enterprise private 5G networks.
- **Complementary to Wi-Fi:** Cisco Private 5G integrates with existing enterprise systems, including existing and future Wi-Fi versions - Wi-Fi 5/6/6E, making operations simple.
- **Visibility across the network and devices:** Using a simple management portal, enterprise IT teams can maintain policy and identity across both Wi-Fi and 5G for simplified operations.
- **Pay-as-you-use subscription model:** Cisco Private 5G is financially simple to understand. With pay-as-you-use consumption models, customers can save money with no up-front infrastructure costs, and ramp up services as they need.
- **Speed time to productivity:** Businesses can spare IT staff from having to learn, design, and operate a complex, carrier class private network.

Mr. Deshmukh V.U.  
Assistant Professor  
Dept of E & TC Engineering  
VPKBIET, Baramati.



# Wireless Communication and Railway

In last few years, wireless technology has seen extensive development as the results they are now in position to satisfy the ever-increasing need for communication services related to management, operation and maintenance of intelligent transportation systems. Existing technologies includes Wi-Fi, WI-Max, Long term evolution, wireless sensor network and ad hoc networks. 5G will place significant emphasis on development in communication services for transportation system and have significant potential to improve the operation, efficiency, dependability of transportation system, and experience of passengers. Communication network of transportation system must be configured in specific way to satisfy the requirement of given transportation system. These days transportation system have stringent standard for their quality, capability and dependability. The dedicated and high quality and efficient communication system required for High-speed Train (HST) of Indian railway. There are two categories of communication that may take place inside the HST: Critical communication and non-critical communication.

**Critical Communication:** The control signaling between High-speed train (HST) and control room or infrastructure comes under the critical communication. This will help to boost speed while improve the efficiency, operation, safety and dependability. These communications are crucial due to the fact that they require high performance function system of the transportation system. System must extensively high dependability and availability. In spite of safety, the secure communication must be their in between control room and moving train. For instance, if we take into consideration a HST, communications based on the Global System for Mobile Railway (GSMR) are used in order to relay telemetry (position) of the train and to issue movement authorizations to it. This information must be kept up to date at least once every one hundred milliseconds in order to raise the maximum speed of the train to more than 300 kilometres per hour.

In the event that it is not updated within one second, there will be an emergency mechanism that will reduce the speed of the train to a number that is considered safe. In order to provide this level of performance, it is required to develop very high-quality communications systems that have redundancy as well as better dependability. GSM-R is widely utilized in HST; however, in the present day, railway operators wish to enhance the performance of the trains and transition to automatic driving; consequently, they require a brand new high-capacity wireless communication system that is able to include high quality video transmissions from train to control centre.

**Non-Critical Communication:** Payload, additional services, and passenger services are the three categories that make use of noncritical communications. In this particular scenario, we need broadband connectivity so that we may provide supplemental services to the passengers, such as high-definition television and data services. The passengers of a high-speed train could have access to a wideband Internet connection..

Mr. Jadhav M.M.

Assistant Professor

Dept of E & TC Engineering

VPKBIET, Baramati.



# Editor's Desk

Dear Readers,

Greetings from Team E & TC Engineering,

Hope you and your family are safe. **“Tell me and I forget. Teach me and I remember. Involve me and I learn.”**, Benjamin Franklin.

The Creative minds of the Electronics and Communication department of VPKBIET have come together to present what they have always wanted to and we congratulate every student and faculty who has given their contribution. We take pride in showing you of how our very own VPKBIET's have imaginations which spread across the horizons. We would like to thank the Management and all the staffs who have supported the **'ELECTRONICA'** initiative and for having trust in the Editorial board by giving us full freedom to choose the contents and design for our magazine. The magazine should serve as a pillar of motivation for every other student who is yet to emerge as an Achiever and to carry the legacy of 'Electronica'

## Thanks for your time!!

Let us know, what you think,  
your suggestions are highly  
appreciated!!!

**You can contact us at:**

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## EDITORIAL TEAM

**Faculty:**

**Dr. B.H.Patil (HoD)**

**Mrs. More Monali U. (Editor)**

